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MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow
Forecasts as of
February 1, 1982



United States
Department of
Agriculture

Soil
Conservation
Service

Montana
Agricultural
Experiment
Station

Bozeman,
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SNOTEL to give more data

New equipment that will determine the daily maximum, minimum, and average temperature is being installed at some SNOTEL sites in Montana. This new equipment is capable of transmitting data from isotopic snow and soil moisture gages and should reduce some maintenance problems.

Four key high elevation locations, three sites with isotopic equipment, and two sites where special data is being collected, are scheduled to receive this new equipment. As funds become available for replacement, additional sites will be retrofitted with this new generation electronics.

One additional site is scheduled for installation this spring. It will bring the total number of active SNOTEL sites in Montana to 65.

Persons interested in obtaining data from SNOTEL or having questions about this telemetry system should feel free to contact the SCS.

Statewide snowpack

Water content doubles during January

January was a good snowfall month over most of Montana. In many locations, the amount of water stored in the mountain snowpack is nearly double that measured on January 1. Frequent storms and cool temperatures have also contributed to a substantial snow accumulation in many valley areas. The mountain snowpack is less dense than normal causing many oversnow travelers to comment on the amount of "deep powder snow." The effects of wind also seem to be more prevalent this year.

Most of the state's mountain watersheds have near average amounts of water stored in the snowpack but there are some areas below and above average.

The below average areas are the northwest corner of the state, the Bearpaw and Highwood Mountains in

north central Montana, a small area in the Red Rock River drainage and parts of the Yellowstone River drainage. Above average snow areas are the Yellowstone River headwaters and the Bitterroot River and its adjacent drainages.

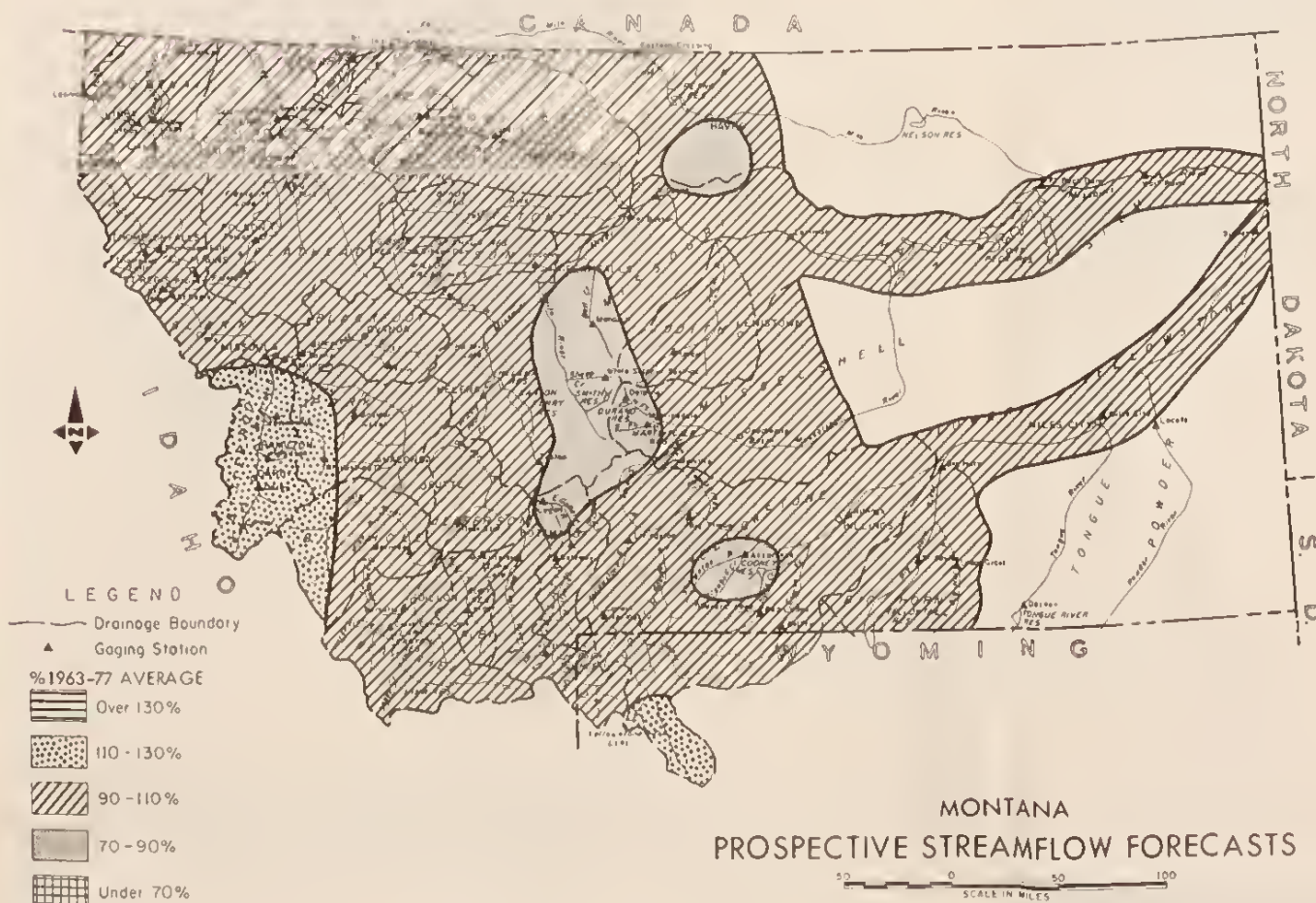
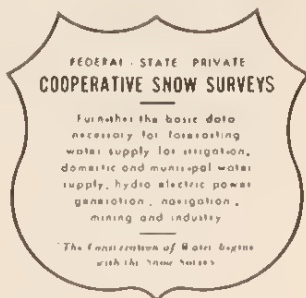
Generally, about two-thirds of the seasonal snow accumulation is in place by February 1. With nearly one-third of the snow season left, some changes can occur, particularly if the remaining months continue to produce above average snowfall.

In most areas, the soils under the snowpack are drier than usual and some of the snowmelt water will be required to fill the soil mantle before runoff begins. Next month, nearly all of the snow courses will be measured to obtain a complete inventory of this year's snow resource.

THE MONTANA WATER SUPPLY OUTLOOK IS A PUBLICATION OF THE U.S. SOIL CONSERVATION SERVICE. THE SCS ADMINISTERS THE COOPERATIVE SNOW SURVEY PROGRAM IN COOPERATION WITH OTHER FEDERAL, STATE, AND PRIVATE AGENCIES, ORGANAIZATIONS, AND INDIVIDUALS.

THE REPORT IS PREPARED BY SCS, SNOW SURVEY AND WATER SUPPLY FORECAST UNIT, P. O. BOX 98, BOZEMAN, MONTANA.

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Statewide streamflow

to be near average

With a few exceptions, most of the state can expect near average runoff this spring and summer.

Above average runoff is expected in the Bitterroot River and adjacent Rock Creek, the extreme headwaters of the Big Hole River and the Yellowstone Lake area.

The areas with below average runoff are portions of the Stillwater River and Rock Creek in the Yellowstone River drainage, small streams in central Montana, and Beaver Creek in the Bearpaw Mountains.

The mountain snowpack is much better than in recent years and should help sustain streamflows well into the main irrigation season.

Missouri River & Hudson Bay Drainages

STREAMFLOW FORECASTS

BASIN STREAM AND OR FORECAST POINT	THIS YEAR		PAST RECORD		THIS YEAR		PAST RECORD	
	FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET	
	Thousand Acre Feet	Percent of Average	Last Year	Average	Thousand Acre Feet	Percent of Average	Last Year	Average
PERIOD	APRIL - SEPTEMBER				APRIL - JULY			
RED ROCK RIVER near Monida (1)	102	93	88.4	110	96.0	93	89.2	103
BEAVERHEAD RIVER near Grant (2)	170	99	133	171	146	99	131	148
BEAVERHEAD RIVER at Barratts (2)	215	95		226	187	95		196
RUBY RIVER near Alder	104	99		105	88.0	99		89.0
BIG HOLE RIVER near Melrose	860	109		792	800	110		730
BOULDER RIVER near Boulder	93.0	90		103	87.0	90		96.7
WILLOW CREEK near Harrison	20.2	94		21.5	18.3	95		19.2
MADISON RIVER near Grayling (3)	486	93	405	523	382	93	320	409
MADISON RIVER near McAllister (4)	850	95	716	892	676	96	602	706
GALLATIN RIVER near Gateway	527	92		572	456	93		488
INFLOW MIDDLE CREEK RESERVOIR near Rozeman (5)	27.8	92		30.3	24.0	92		26.2
HYALITE CREEK near Rozeman (6)	42.6	90		47.4	37.3	91		41.0
GALLATIN RIVER at Logan	555	86		649	481	86		557
MISSOURI RIVER at Toston (7)	2655	99	2817	2,671	2300	99	2619	2,330
SHEEP CREEK near White Sulphur Springs	20.0	88		22.8	17.5	88		19.8
SUN RIVER at Gibson Dam (8)	565	97	498	580	520	98	457	529
8ELT CREEK near Monarch	127	87		146	116	87		134
MISSOURI RIVER at Fort Benton (9)	4147	100		4,148	3635	100		3,640
TWO MEDICINE CREEK near Browning (10)	238	92		259	226	93		244
8ADGER CREEK near Browning	120	90		133	104	90		116
MARIAS RIVER near Shelby	535	93	432	577	500	94	408	532
MISSOURI RIVER at Virgelle (11)	4780	100		4,793	4240	100		4,238
MISSOURI RIVER near Landusky (11)	5323	102		5,214	4675	102		4,586
NORTH FORK MUSSELSHELL RIVER near Delpine	5.7	89		6.4	4.9	89		5.5
SOUTH FORK MUSSELSHELL RIVER above Martinsdale	53.0	86		61.5	50.0	87		57.6
MISSOURI RIVER below Fort Peck Dam (11)	5027	102		4,929	4468	102		4,381
MILK RIVER at Eastern Crossing	275*	99		278*				
MILK RIVER at Eastern Crossing (12)	108*	98		111*				
INFLOW LAKE SAKAKAWA, ND (11)	13315	99		13,450	12110	99		12,239
SASKATCHEWAN RIVER BASIN								
SWIFTCURRENT CREEK at Sherburne (13)	121	92	121	132	107	93	109	115
ST. MARY'S RIVER near Rabb (13)	472	96		498	410	96		426

*For period March through September

Headwaters show average snowpack

Most of the headwaters of the Missouri River have near average amounts of water stored in the snowpack, but there are some areas with above and below average conditions.

Below average snowpack is reported in parts of Glacier National Park in the St. Mary's River headwaters, the Bearpaw and Highwood Mountains in north central Montana, the East Gallatin River headwaters, and a small area near Red Rock Lakes in Red Rock River drainage.

Above average snow water contents were measured in the headwaters of the Big Hole River and the Madison River headwaters in Yellowstone National Park.

Mountain soils under the snowpack are drier than usual throughout most of the drainage. Considerable wind action has moved snow in the exposed and unprotected areas, and the snow is less dense than normal.

Many valley areas have above average snow accumulation due to frequent snowfalls and cool temperatures that have prevented any significant melting.

- (1) Adjusted for storage in Lima Reservoir.
- (2) Adjusted for storage in Lima and Clark Canyon Reservoirs.
- (3) Adjusted for storage in Hebgen Lake.
- (4) Adjusted for storage in Hebgen Lake and Ennis Lake.
- (5) Sum of West Fork Hyalite Creek and East Fork Hyalite Creek above the Reservoir.
- (6) Adjusted for storage in Middle Creek Reservoir.
- (7) Adjusted for storage in Lima, Hebgen, Ennis & Clark Canyon Reservoirs.

- (8) Adjusted for storage in Gibson Reservoir & diversions.
- (9) Adjusted for storage in Lima, Clark Canyon, Hebgen, Ennis, Gibson, Pishkun, Willow Creek & Canyon Ferry Reservoirs.
- (10) Adjusted for storage in Two Medicine Reservoir & diversions in Two Medicine Canal.
- (11) Adjusted for all upstream reservoirs.
- (12) Flow at Eastern Crossing minus St. Mary's Canal.
- (13) Adjusted for storage in Lake Sherburne.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUBWATERSHED	Number of Gauges Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Beaverhead	11	172	105
Ruby	3	198	108
Big Hole	7	200	117
Boulder	12	190	95
Jefferson	33	187	106
Madison	18	201	109
Gallatin	14	203	91
Missouri Headwater West-side Missouri (Toston-Cascade)	65	195	103
Smith	8	170	93
Smith	5	175	100
Belt-Arrow	3	199	96
Missouri Main-stem	16	177	96
Teton & Sun	4	258	94
Marias	3	201	106
Marias-Teton-Sun	7	221	101
Judith	5	175	100
Musselshell	5	175	100
Judith-Musselshell	10	175	100
Milk	7	262	103
Bear Paws	6	281	85
Missouri (Total)	98	193	102

Saskatchewan

St. Mary's	2	140	96
Bow River in Alberta	5	70	79



Streamflow levels near average

The major portions of the Missouri River drainage are forecast to have near average streamflow during the spring and summer months. Flows should hold up well into the irrigation season in most streams.

Some areas in central Montana are currently forecast to have streamflows a little below average, but many of these have some stored water to supplement late season irrigation supplies.

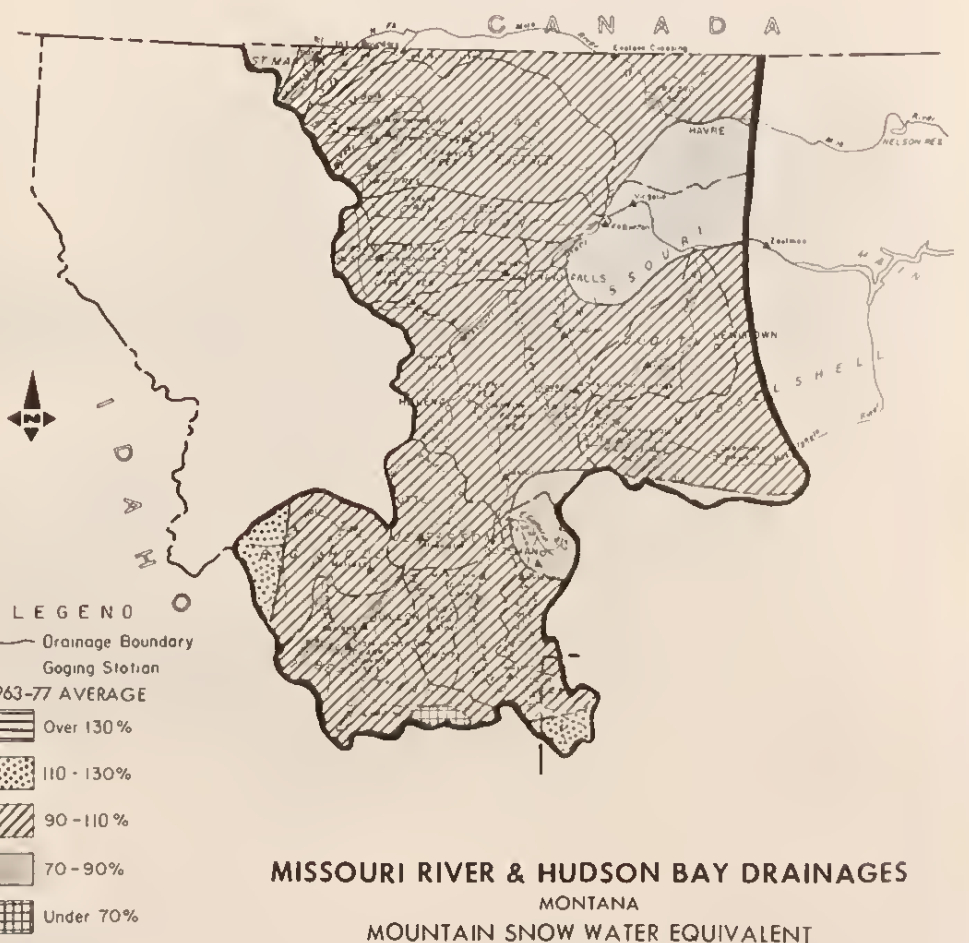
Depending on climatic and soil conditions, some runoff may be generated from valley areas when temperatures moderate.

Most irrigation and multipurpose reservoirs have near average storage levels and should fill with spring runoff.

WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" with Respect to Usual Supply

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Beaverhead	Avg	Avg
Ruby	Avg	Avg
Big Hole	Exc	Avg
Boulder	Avg	Avg
Jefferson	Avg	Avg
Madison	Avg	Avg
Gallatin	Avg	Avg
West-Side Missouri	Avg	Avg
Smith-Belt	Avg	Avg
Sun	Avg	Avg
Teton	Avg	Avg
Marias	Avg	Avg
Judith	Avg	Avg
Musselshell	Avg	Avg
Milk	Exc	Avg
Bear Paws	Avg	Fair
St. Mary's	Avg	Avg



SNOW SURVEY DATA

SNOW FEBRUARY 1982

DRAINAGE BASIN and/or SNOW COURSE	Elevation	Date of Survey	THIS YEAR		PAST RECORD	
			Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
ARCH FALLS	7350	1/26	32	7.8	2.0	9.1
ASHLEY DIVIDE	4820	1/29	32	7.0	1.4	-
ASHLEY LAKE	4300	1/29	27	5.6	1.8	-
BADGER PASS	6900	2/03	104	23.0A	17.0	29.5
BADGER PASS PILLOW	6900	2/01	SP	24.6	15.0	-
BANFIELD MOUNTAIN	5600	1/25	53	15.4	10.6	18.2
BANFIELD MOUNTAIN PILLOW	5600	1/25	SP	13.7	10.5	15.2
BARKER LAKES PILLOW	8250	2/01	SP	10.3	7.7	-
BASIN CREEK	7180	1/28	33	8.0	4.2	-
BASIN CREEK PILLOW	7150	2/01	SP	6.3	4.5	-
BEAGLE SPRINGS PILLOW	8650	2/01	SP	6.9	2.4	-
BEAR PAW SKI AREA	5200	1/27	19	3.4	0.6	4.6
BLACK BEAR	7950	1/28	104	35.6	16.8	27.4
BLACK BEAR PILLOW	7950	1/28	SP	33.8	16.2	25.0
BLACK PINE	7100	1/28	44	10.7	3.1	9.4
BLACK PINE PILLOW	7100	1/28	SP	12.2	5.5	10.7
BLOODY DICK PILLOW	7600	2/01	SP	11.6	5.5	-
BLUE LAKE	5900	2/03	82	20.5A	8.5	18.3
BOULDER MOUNTAIN PILLOW	7950	2/01	SP	15.4	5.7	-
BOX CANYON PILLOW	6670	2/01	SP	5.8	4.5	-
BRIDGE HOLE	7250	1/27	56	17.1	8.4	20.0
BRIDGE HOLE PILLOW	7250	1/27	SP	15.5	9.2	18.9
CALVERT CREEK PILLOW	6450	2/01	SP	3.7	3.4	7.7
CARROT BASIN	9000	1/25	85	28.0	14.1	26.7
CARROT BASIN PILLOW	9000	1/25	SP	19.4	10.9	19.7
CASHE CREEK PILLOW	7800	2/01	SP	7.0	2.8	-
CHESSMAN RESERVOIR	6200	1/24	13	2.9	0.3	2.8
CHICKEN CREEK	4060	1/26	47	11.1	7.6	-
CLOVER MEADOW PILLOW	3600	2/01	SP	13.0	8.2	-
COLE CREEK	7850	1/28	33	8.8	6.5	12.5
COLE CREEK PILLOW	7850	1/28	SP	8.0	5.6	12.3
COMBINATION	5600	1/28	22	4.8	0.1	4.3
COMBINATION PILLOW	5600	1/28	SP	4.9	0.6	4.4
COPPER BOTTOM PILLOW	5200	2/01	SP	10.8	3.8	10.5
COPPER CAMP PILLOW	6950	2/01	SP	27.0	13.6	30.0
COPPER MOUNTAIN	7700	1/30	36	8.6	4.9	8.0
COYOTE HILL	4200	1/27	39	8.6	3.2	8.1
CRYSTAL LAKE PILLOW	6100	2/01	SP	8.5	7.7	-
DAISY PEAK	7600	1/28	38	8.2	4.4	-
DAILY CREEK	5780	1/29	41	10.6	4.5	8.5
DAILY CREEK PILLOW	5780	2/01	SP	9.2	7.6	-
DARKHORSE LAKE PILLOW	8700	2/01	SP	22.0	11.0	-
DEADMAN CREEK	6450	1/27	36	8.6	4.0	9.0
DEADMAN CREEK PILLOW	6450	1/27	SP	7.7	3.1	8.2
DESERT MOUNTAIN	5600	2/03	42	10.9	7.9	11.6
DEVIL'S SLIDE	8100	1/26	54	15.4	6.6	15.6
DISCOVERY BASIN	7050	1/28	41	8.8	4.4	8.1
DIVIDE PILLOW	7900	2/01	SP	9.5	4.2	7.7
DIX HILL	6400	1/30	37	9.8	3.6	8.2
ELK PEAK	8000	2/01	31	7.6	-	-
EMERY CREEK	4350	2/03	48	12.4	8.0	11.9
EMERY CREEK PILLOW	4350	2/03	SP	12.3	8.2	-
FISH CREEK	8000	1/28	37	9.6	4.0	-

SNOW FEBRUARY 1982

DRAINAGE BASIN and/or SNOW COURSE	Elevation	Date of Survey	THIS YEAR		PAST RECORD	
			Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
FISHER CREEK	9100	2/01	EST	22.5	16.0	28.0
FISHER CREEK PILLOW	9100	2/01	SP	20.8	15.1	26.6
FLATTOP MOUNTAIN PILLOW	6700	2/01	SP	30.4	26.4	35.2
FLECCER RIDGE	7500	1/29	39	9.4	-	8.3
FOURTH OF JULY	3450	1/23	34	7.4	2.8	-
FRIDAY HILL	4620	1/28	55	14.8	9.1	-
FRIEDNER MEADOWS	6480	1/28	24	5.5	0.5	6.2
FRIEDNER MEADOWS PILLOW	6480	1/28	SP	5.9	3.0	6.5
GARVER CREEK	4250	1/25	33	8.2	6.6	9.1
GARVER CREEK PILLOW	4250	1/25	SP	7.0	7.5	8.1
GIBBONS PASS	7100	1/29	74	20.4	11.2	16.7
GRAVE CREEK	4300	1/25	41	11.0	6.8	13.7
GRAVE CREEK PILLOW	4300	1/25	SP	11.7	7.0	13.5
GRIZZLY PEAK	3640	1/28	30	7.6	5.5	10.9
HAWKINS LAKE	6450	1/25	59	18.8	17.1	23.0
HAWKINS LAKE PILLOW	6450	1/25	SP	16.7	16.0	22.1
HEART LAKE TRAIL	4870	1/27	68	16.3	4.0	12.8
HEBGEN DAM	6550	1/29	40	9.6	5.2	8.9
HELL ROARING DIVIDE	5770	1/30	64	17.3	14.0	23.3
HERRIS JUNCTION	4850	1/26	67	18.5	13.7	-
HOLBROOK	4530	2/03	50	11.0A	1.5	7.7
HOOD MEADOW	6600	1/26	27	7.0	1.8	8.1
HOODOO BASIN	6010	1/27	120	37.2	20.4	36.3
HOODOO BASIN PILLOW	6000	2/01	SP	32.4	17.0	34.6
HOODOO CREEK	5900	1/27	114	33.0	16.6	32.5
INTERMOUNTAIN	6450	1/29	27	5.8	3.0	6.2
JOHNSON PARK	6450	1/28	27	5.0	1.5	-
KINGS HILL	7500	1/27	42	10.6	6.4	10.8
KIWANIS CAMP	3720	1/27	14	2.1	0.6	1.3
KRAFT CREEK PILLOW	4750	2/01	SP	11.7	3.6	-
LAKEVIEW CANYON	6930	1/29	26	5.9	4.7	9.1
LAKEVIEW RIDGE	7400	1/27	25	5.6	4.4	8.3
LAKEVIEW RIDGE PILLOW	7400	2/01	SP	6.6	6.5	-
LEMHI RIDGE PILLOW	8100	2/01	SP	6.5	3.1	7.0
LICK CREEK	6960	1/24	29	6.9	1.4	7.1
LICK CREEK PILLOW	6960	1/26	SP	6.3	4.3	6.4
LOWER TWIN PILLOW	7900	2/01	SP	15.0	10.4	-
LUBRECHT FLUME	4300	2/01	32	5.5	0.2	4.5
LUBRECHT FLUME PILLOW	4300	2/01	SP	6.2	0.2	4.3
LUBRECHT FOREST # 3	5450	2/02	35	7.6	0.5	5.9
LUBRECHT FOREST # 4	4650	2/02	24	4.4	0.3	3.1
LUBRECHT FOREST # 6	4040	2/02	28	5.4	0.3	3.5
LUBRECHT HYDROPLANT	4200	2/01	32	5.5	0.7	5.1
MADISON PLATEAU	7750	1/28	59	17.1	8.3	15.6
MADISON PLATEAU PILLOW	7750	1/28	SP	13.2	10.0	16.5
MANY GLACIER	4960	1/31	56	15.9	10.5	-
MANY GLACIER PILLOW	4960	1/31	SP	14.2	9.7	-
MARIAS PASS	5250	1/30	54	15.5	6.2	12.0
MAYNARD CREEK	6210	1/27	34	8.8	3.0	10.1
MAYNARD CREEK PILLOW	6210	1/27	SP	7.3	5.1	8.5
MOUNTAIN PEAK PILLOW	8300	2/01	SP	16.5	8.6	-
MOULDER RESERVOIR	6650	1/29	28	5.9	2.2	-
MOUNT LOCKHART	6400	2/01	EST	15.5	7.0	16.7
MOUNT LOCKHART PILLOW	6400	2/01	SP	14.0	7.5	14.9
NEVADA CREEK PILLOW	6450	2/01	SP	10.9	5.1	-

SNOW FEBRUARY 1982

DRAINAGE BASIN and/or SNOW COURSE	Elevation	Date of Survey	THIS YEAR		PAST RECORD	
			Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
NEW WORLD	6700	1/27	34	9.4	4.4	10.7
NEWTON MOUNTAIN	5600	1/28	70	23.2	17.6	-
NEZ PERCE CAMP PILLOW	5450	2/01	SP	10.0	4.5	-
NEZ PERCE CREEK	6500	1/30	25	5.2	1.9	5.5
NOISY BASIN	6040	2/03	105	23.3	25.2	30.8
NOISY BASIN PILLOW	6040	2/03	SP	26.1	22.3	26.6
NORTH FK. ELK CREEK	6250	2/01	44	10.8	2.6	9.2
NORTH FK. ELK CREEK PILLOW	6250	2/01	SP	10.9	3.4	9.3
NORTH FORK JOCKO	6350	1/27	97	30.4	18.1	-
NORTHEAST ENTRANCE	7400	2/01	31	7.6	2.2	7.4
NORTHEAST ENTRANCE PILLOW	7400	2/01	SP	6.9	3.6	7.2
OPHIR PARK	7150	1/30	49	13.8	8.8	14.3
PETERSON MEADOWS	7200	1/28	31	7.0	5.2	7.1
PETERSON MEADOWS PILLOW	7200	1/28	SP	6.6	5.5	7.1
PICKFOOT CREEK PILLOW	6650	2/01	SP	7.7	1.9	-
PICNIC GROUNDS	6500	1/29	20	3.9	0.4	3.3
PIKE CREEK PILLOW	5930	2/01	SP	20.0	10.3	-
PIPESTONE PASS	7200	1/30	15	3.0	0.0	3.8
POORMAN CREEK	5100	1/25	70	21.1	11.4	25.6
POORMAN CREEK PILLOW	5100	1/25	SP	19.9	22.7	22.7
PORCUPINE PILLOW	6500	2/01	SP	5.0	1.5	-
RED TOP	5260	1/28	62	18.9	13.8	-
ROCKER PEAK	8000	2/01	EST	10.5	7.1	11.8
ROCKER PEAK PILLOW	8000	2/01	SP	11.6	7.7	11.0
ROCKY BOY	4700	1/27	14	2.4	0.6	3.4
ROCKY BOY PILLOW	4700	1/27	SP	3.3	1.7	3.5
SADDLE MOUNTAIN	7940	1/27	79	22.6	11.8	18.8
SADDLE MOUNTAIN PILLOW	7940	1/27	SP	22.6	12.6	19.5
SHOWER FALLS	8100	1/26	58	16.4	6.7	17.5
SHOWER FALLS PILLOW	8100	2/01	SP	16.4	8.7	17.0
SKALKIHO SUMMIT PILLOW	7260	2/01	SP	22.6	10.8	-
SKYLARK TRAIL PILLOW	6200	2/01	SP	24.8	9.6	-
SPOTTED BEAR MOUNTAIN	7000	1/27	45	10.3A	4.2	11.2
SPUR PARK	8100	1/27	60	17.3	10.2	16.1
SPUR PARK PILLOW	8100	1/27	SP	16.8	11.0	16.5
STAHL PEAK	6050	1/25	69	20.3	21.8	31.0
STAHL PEAK PILLOW	6050	1/25	SP	19.4	17.9	24.1
STORM LAKE	7780	1/28	36	7.9	6.2	9.6
STRYKER BASIN	6180	1/27	68	19.7	15.0	-
STUART MILL	6500	1/29	23	4.7	0.3	4.9
STUART MOUNTAIN	7400	1/27	76	23.6	14.2	23.9
SUCKER CREEK	3960	1/27	0	0.0	0.4	0.6
TAYLOR ROAD	4080	1/27	15	2.6	1.0	2.7
TEN MILE LOWER	6600	1/27	24	4.4	2.0	5.5
TEN MILE MIDDLE	6800	1/27	36	7.9	6.0	8.3
TEN MILE UPPER	8000	1/29	38	9.5	7.6	10.2
TEPEE CREEK	8000	2/01	EST	11.0	6.0	11.1
TEPEE CREEK PILLOW	8000	2/01	SP	9.8	5.1	2.1
TRINKIS LAKE	6100	1/27	91	29.2	19.5	-
TRUMAN CREEK	4060	1/29	19	3.8	0.6	-
TV MOUNTAIN	6300	1/27	51	12.6	7.2	13.3
TWELVEMILE CREEK	5600	1/27	80	23.0	4.7	16.9
TWELVEMILE CREEK PILLOW	5600	1/27	SP	18.8	4.2	14.4
TWENTY-ONE MILE	7150	1/29	49	10.5	6.5	13.6
TWIN CREEKS	3580	2/03	54	12.0A	3.0	8.9
TWIN LAKES	6510	2/01	EST	38.0	17.0	30.9
TWIN LAKES PILLOW	6510	2/01	SP	37.0	16.3	30.7

SNOW FEBRUARY 1982

DRAINAGE BASIN and/or SNOW COURSE	Elevation	Date of Survey	THIS YEAR		PAST RECORD	
			Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
UPPER HOLLAND LAKE	4200	1/27	80	22.8	14.6	-
WALDRON	5600	2/01	EST	7.5	0.5	7.3
WALDRON PILLOW	5600	2/01	SP	7.8	2.3	8.4
WARM SPRINGS	7600	2/01	65	17.3	9.2	-
WARM SPRINGS PILLOW	7600	2/01	SP	18.3	9.7	-
WEASEL DIVIDE	5450	1/25	67	19.7	17.4	26.8
WEST ROSEHURD	7500	1/27	23	5.4	2.6	7.3
WEST YELLOWSTONE	6700	1/29	36	7.3	2.6	8.9
WEST YELLOWSTONE PILLOW	6700	1/29	SP	7.0	3.1	6.6
WHISKEY CREEK	6800	1/28	60	16.8	7.8	13.5

Columbia River Drainage

STREAMFLOW FORECASTS

BASIN, STREAM and or FORECAST POINT	THIS YEAR				PAST RECORD				THIS YEAR				PAST RECORD											
	FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET									
	Thousand Acre Feet	Percent of Average	Last Year	Average	Thousand Acre Feet	Percent of Average	Last Year	Average	Thousand Acre Feet	Percent of Average	Last Year	Average	Thousand Acre Feet	Percent of Average	Last Year	Average								
	APRIL - SEPTEMBER								APRIL - JULY								APRIL - JUNE							
KOOTENAI RIVER below Libby Dam (1)	7,030	97	6,726	7,246	5,993	97	5,516	6,178																
FISHER RIVER near Libby	242	90		270	227	90		253																
YAAK RIVER near Troy	484	90		537	462	90		514																
KOOTENAI RIVER at Leonia (1)	8,610	96	7,941	8,883	7,495	97	6,601	7,727	7,270	97	4,573	6,150												
INFLOW MOULTON RESERVOIR nr BUTTE (Million Gallons)					276	97	378	286	250	96	352	260												
WARM SPRINGS CREEK AT MEYERS DAM near Anaconda (2)	55.3	109		50.7	45.1	109		41.2																
FLINT CREEK near Southern Cross (3)	18.5	100	23.8	18.5	15.5	101	20.3	15.4																
FLINT CREEK below Boulder Creek (4)	77.0	99		77.6	60.8	99		61.3																
INFLOW LOWER WILLOW CREEK RESERVOIR near Hall (5)	17.9	106		16.9	16.9	106		16.0																
MIDDLE FORK ROCK CREEK near Philipsburg	90.8	115		78.8	82.0	115		71.1																
NEVADA CREEK near Finn	21.2	90		23.6	19.8	91		21.8																
BLACKFOOT RIVER near Bonner	935	92		1,017	845	92		920	730	92		794												
CLARK FORK RIVER above Milltown (6)	790	94		843	685	94		730	575	94		613												
CLARK FORK RIVER above Missoula	1,725	93	1,530	1,859	1,530	93	1,359	1,651	1,305		1,148	1,408												
WEST FORK BITTERROOT RIVER near Conner (7)	220	118		187	205	119		172																
BITTERROOT RIVER near Darby	715	119	445	602	660	120	401	552	575	120	339	480												
SKALKAHO CREEK near Hamilton	65.0	113		57.4	57.0	114		49.8																
BURNT FORK CREEK near Stevensville (8)	42.5	110		38.8	37.3	110		33.6																
BITTERROOT RIVER at Missoula (9)	1,730	112		1,543	1,595	113		1,416	1,365	113		1,211												
CLARK FORK RIVER below Missoula	3,455	101		3,405	3,125	102		3,069	2,670	102		2,618												
CLARK FORK RIVER at St. Regis	4,566	101	3,586	4,521	4,080	100	3,240	4,078	3,500	100	2,797	3,492												
NORTH FORK FLATHEAD RIVER near Columbia Falls	1,770	90		1,969	1,600	90		1,782	1,370	91		1,498												
MIDDLE FORK FLATHEAD RIVER near West Glacier	1,810	95	1,504	1,911	1,670	95	1,385	1,750	1,400	95	1,134	1,470												
SOUTH FORK FLATHEAD RIVER near Columbia Falls (10)	2,140	93	1,815	2,302	2,000	93	1,714	2,159	1,750	93	1,475	1,884												
FLATHEAD RIVER at Columbia Falls (10)	5,900	93	5,061	6,330	5,400	93	4,664	5,827	4,600	93	3,860	4,964												
SWAN RIVER near Big Fork	630	93		681	555	93		596																
FLATHEAD RIVER near Polson (11)	6,900	93	6,097	7,394	6,360	93	5,622	6,806	5,400	93	4,600	5,779												
CLARK FORK RIVER near Plains (11)	12,100	98	10,071	12,340	11,000	98	9,190	11,222	9,300	98	7,570	9,507												
THOMPSON RIVER near Thompson Falls	244	93		263	217	93		234																
PROSPECT CREEK at Thompson Falls	135	94		143	125	94		133																
CLARK FORK RIVER at Whitehorse Rapids (12)	13,500	98		13,781	12,270	98		12,519	10,420	98		10,633												

- (1) Adjusted for storage in Lake Koocanusa.
(2) Adjusted for storage in Silver Lake, diversions to and pumping from Georgetown Lake.
(3) Adjusted for storage in Georgetown Lake, diversions from and pumping to Silver Lake.
(4) Sum Flint Creek at Maxville and Boulder Creek at Maxville.
(5) Sum of North Fork Lower Willow Creek near Hall and South Fork Lower Willow Creek near Hall.
(6) Difference in observed flow Clark Fork above Missoula and Blackfoot near Bonner.

- (7) Adjusted for storage in Painted Rocks Reservoir.
(8) Adjusted for diversion into Sunset Highline Canal.
(9) Difference in observed flow Clark Fork above and below Missoula.
(10) Adjusted for storage in Hungry Horse Reservoir.
(11) Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.
(12) Adjusted for storage in Hungry Horse Reservoir, Flathead Lake and Noxon Rapids Reservoir.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE



WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" With Respect to Usual Supply

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Tobacco	Avg	Fair
Little Bitterroot	Avg	Fair
Mission Valley	Avg	Avg
Flint Creek	Exc	Avg
Upper Clark Fork	Avg	Avg
Nevada Creek	Avg	Avg
Blackfoot	Avg	Avg
West-side Bitterroot	Exc	Exc
East-side Bitterroot	Exc	Exc
Bitterroot River	Exc	Exc
Lower Clark Fork	Avg	Avg

Below average

runoff forecast

Most drainages are forecast to have near to a little below average runoff this spring and summer. The exceptions are the Bitterroot River drainage and the nearby Rock Creek drainage where above average runoff is expected to be produced by the good snowpack in this area.

The high elevation snow is also expected to produce good streamflow during the main irrigation season. Irrigation reservoir storage is a little below average but all should fill with spring runoff.



C A N A D A



Snowpack varies throughout drainage

Variable storm patterns across western Montana have created different snowpack conditions.

The Bitterroot River drainage and the adjacent areas east of the Bitterroot have above average water stored in the snowpack.

The northwest corner of the state has below average snow even though January snowfall was above average in almost all areas.

Most of the Flathead and Lower Clark Fork Rivers, the Blackfoot River, and upper portions of the Clark Fork River drainages have near average snowpack in their headwater areas.

Valley snowpacks have continued to accumulate because of frequent snowfall and very little melting during this past month.

Soils beneath the snow are generally drier than normal in nearly all watersheds.

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
East Kootenay/8C.	22	107	94
Kootenai/Montana	13	117	80
Kootenai above Bonners Ferry...	35	111	88
Little Bitterroot	--	---	---
N. Fk. Flathead..	9	116	78
M. Fk. Flathead..	6	158	99
S. Fk. Flathead..	7	153	102
Swan	3	124	96
Flathead	25	135	91
Stillwater & Whitefish.....	1	123	74
Clark Fork above Blackfoot	24	204	100
Blackfoot	15	262	107
Upper Clark Fork above Missoula ..	39	228	103
Bitterroot	11	239	122
Lower Clark Fork below Missoula ..	12	182	95
Clark Fork (Total w/o Flathead)...	62	214	105
Pend O'Reille (Clark Fork & Flathead)	87	174	97
Columbia (Pend O'Reille & Kootenai)	122	163	99

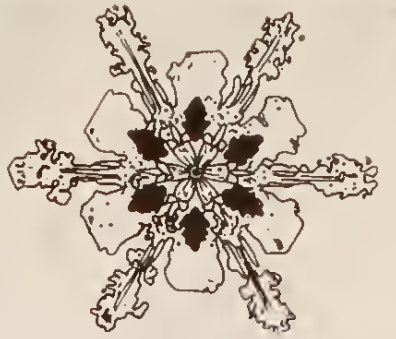
Yellowstone River Drainage

STREAMFLOW FORECASTS

BASIN, STREAM and/or FORECAST POINT	THIS YEAR		PAST RECORD		THIS YEAR		PAST RECORD	
	FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET	
	Thousand Acre Feet	Percent of Average	Last Year	Average	Thousand Acre Feet	Percent of Average	Last Year	Average
PERIOD	APRIL - SEPTEMBER				APRIL - JULY			
YELLOWSTONE RIVER at Corwin Springs	2060	98	1703	2,102	1720	98	1466	1,749
YELLOWSTONE RIVER near Livingston	2340	95		2,471	1940	95		2,048
BOULDER RIVER at Big Timber	398	96		416	365	96		382
STILLWATER near Absarokee (1)	575	87		660	485	87		555
CLARK'S FORK RIVER near Beifry	628	98		644	555	98		564
ROCK CREEK near Red Lodge	113	96	123	118	88.0	96	98.6	91.4
INFLOW COONEY RESERVOIR near Boyd (2)	49.0	76		64.5	40.0	76		52.5
YELLOWSTONE RIVER at Billings	4455	95	3998	4,682	3780	95	3628	3,979
8IGHORN RIVER near St. Xavier (3)	2170	104	1331	2,034	1930	104	1328	1,861
LITTLE 8IGHORN RIVER near Hardin	182	93		196	160	93		174
YELLOWSTONE RIVER at Miles City (4)	6863	96		7,142	6000	96		6,243
YELLOWSTONE RIVER near Sidney (5)	7523	96		7,806	6550	96		6,805

- (1) Adjusted for storage in Mystic Lake.
(2) Adjusted for storage in Cooney Reservoir.
(3) Adjusted for storage in Buffalo Bill, Boysen, Bull Lake, Pilot Butte and Bighorn Reservoirs.
(4) Adjusted for storage in Bull Lake, Buffalo Bill, Boysen, Pilot Butte, Bighorn and Tongue River Reservoirs.
(5) Adjusted for reservoirs shown in (4) and diversions into the Lower Yellowstone Canal.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE



Average streamflows forecast now

Streamflows during the spring and summer months are forecast to be near average on most streams and rivers.

The inflow to Yellowstone Lake is forecast to be above average. This will help provide good late season flows on the Yellowstone River.

Below average runoff is expected in portions of the Stillwater River and Red Lodge Creek.

WATER SUPPLY OUTLOOK

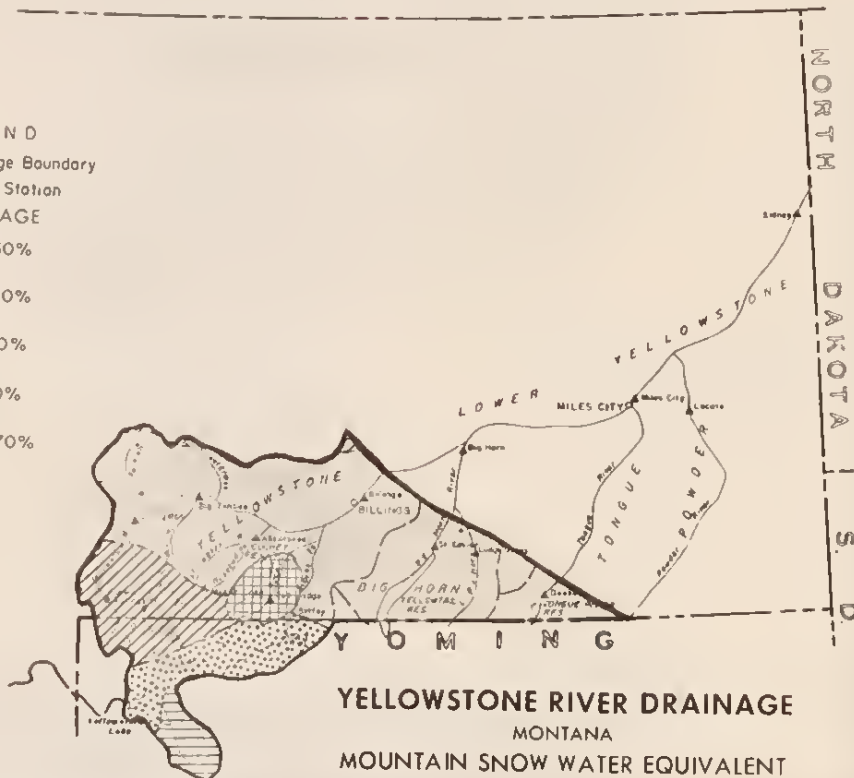
Expressed as "Poor, Fair, Average, Excellent" With Respect to Usual Supply

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Yellowstone at Livingston	Exc	Avg
Shields	Avg	Fair
Boulder	Avg	Avg
Sweetgrass - Big Timber	Avg	Fair
Stillwater	Avg	Avg
Rock Creek	Avg	Fair
Clark's Fork	Avg	Avg
Yellowstone above Bighorn	Avg	Avg
Bighorn	Avg	Avg
Little Bighorn	Avg	Fair
Tongue	Avg	Fair
Powder	Avg	Avg
Lower Yellowstone	Avg	Avg



C A N A D A

- LEGEND
- Drainage Boundary
 - Gaging Station
 - %1963-77 AVERAGE
 - Over 130%
 - 110-130%
 - 90-110%
 - 70-90%
 - Under 70%



YELLOWSTONE RIVER DRAINAGE MONTANA MOUNTAIN SNOW WATER EQUIVALENT

Snowpack varies throughout drainage

The snowpack varies over the Yellowstone River drainage with the better conditions in the southern headwaters, decreasing downstream and to the northeast.

Around Red Lodge, the amount of water stored in the snowpack is near 70 percent of average, while in the Yellowstone River headwaters above Yellowstone Lake, it is about 130 percent of average.

The snowpack in the north end of the Big Horn Mountains is well below average, increasing to near average in the Powder River headwater area. The Big Horn River basin has an above average snowpack.

This season, there has been considerable snow transported by the wind in the more open and exposed areas.

Mountain soils under the snow are generally drier than normal.

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Gauges Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average
Upper Yellowstone ab Livingston ..	13	201	96
Shields	4	189	84
Boulder & Stillwater	1	207	73
Rock Creek & Clark's Fork	10	166	83
Yellowstone (ab Bighorn River)	28	186	89
Bighorn/Wyoming	27	193	111
Little Bighorn	4	186	76
Bighorn (Total)	31	193	106
Tongue	10	161	78
Powder	7	188	98
Yellowstone (Total)	76	186	94



Mountains "shiver" too !

We all know how cold it can get in town at night, but how about in the mountains? Because cold air flows downslope and temperature inversions often occur in valleys, it can be warmer in the mountains than it is in town.

Most Montanans experienced their coldest night this winter on February 4-5, 1982. SNOTEL reports indicate that the same was true in the mountains.

The extensive cold air system that covered nearly all of the state sent temperatures at most SNOTEL sites to their lowest points this winter.

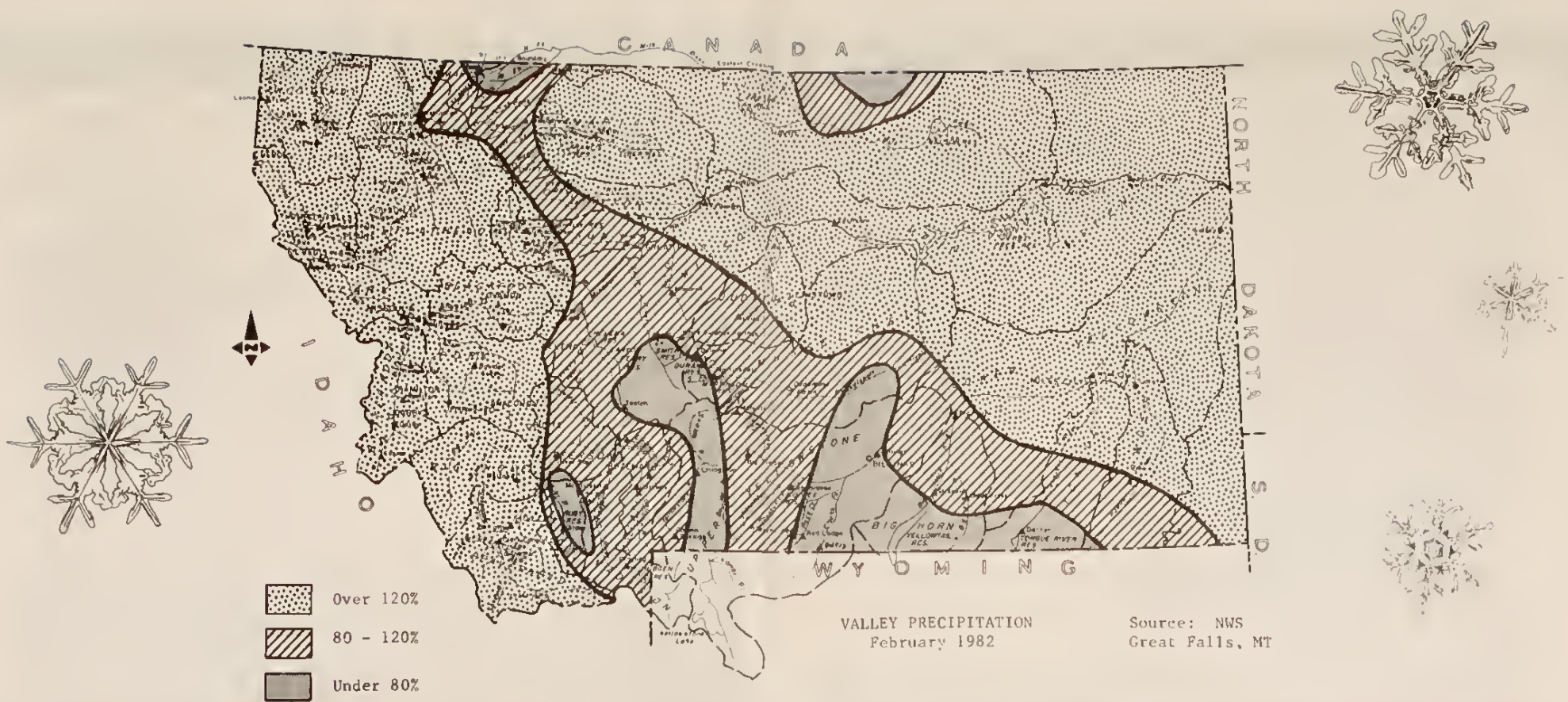
Three of the coldest locations were at Calvert Creek in the Big Hole drainage (-45°F), at Deadman Creek near White Sulphur Springs (-47°F), and at Northeast Entrance to Yellowstone National Park (-47°F).

A -58°F reading was recorded at Whiskey Creek near West Yellowstone. Sensors on SNOTEL can only measure temperatures down to -58°F, so it is highly likely that the actual minimum was even lower than that.



Weather Outlook for February

The National Weather Service in Great Falls is expecting February to have below normal temperatures and near normal precipitation over most of Montana.



RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH January Average based on 1963-77 period.

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage			
			This Year	Last Year	Average	
COLUMBIA						
Kootenai	Kootenai	5,748.2	2,717.0	2,858.0	---	
Flathead	Hungry Horse	3,451.0	2,381.0	2,829.0	2,341.0	
	Flathead Lake	1,791.0	887.0	1,185.0	1,253.0	
	Camas (4)	45.2	20.0	23.2	20.7	
	Mission Valley (8)	100.3	22.4	34.7	37.0	
	Clark Fork	Georgetown Lake	31.0	29.8	29.6	27.3
	Lower Willow Creek	4.9	1.2	2.3	1.6	
	Nevada Creek	12.6	---	5.1	5.8	
	Noxon Rapids	334.6	320.1	318.6	315.2	
	Bitterroot	Painted Rocks	31.7	---	---	17.6
	Como	34.9	7.8	24.1	11.3	
MISSOURI						
Beaverhead	Lima	84.0	25.6	48.3	39.5	
	Clark Canyon	257.2	158.5	161.9	135.9	
Ruby	Ruby	38.8	---	---	24.3	
Madison	Hebgen Lake	377.5	274.6	276.4	241.5	
	Ennis Lake	41.0	31.4	29.9	35.3	
Gallatin	Middle Creek	8.0	3.5	3.8	3.3	
Missouri	Canyon Ferry	2,043.0	1,590.0	1,717.0	1,661.0	
	Hauser & Helena	61.9	61.9	63.0	60.2	
	Lake Helena	10.4	10.4	10.9	9.9	
	Holter Lake	81.9	81.4	81.9	70.8	
	Fort Peck Lake	18,910.0	14,180.0	15,140.0	15,570.0	
Smith	Smith River	10.6	6.0	5.6	6.7	
	Newlan Creek	12.4	10.3	9.7	---	
	Musselshell	Sair	7.0	2.8	3.5	4.4
	Martinsdale	23.1	10.8	10.6	9.9	
	Deadman's Basin	72.2	---	---	46.8	
	Sun	Gibson	99.1	44.5	56.8	41.4
	Willow Creek	32.2	22.8	19.2	21.2	
	Pishkun	32.0	19.8	19.4	16.5	
Marias	Lower Two Medicine	11.9	---	---	6.2	
	Four Horns	19.2	---	---	13.2	
	Swift	30.0	7.6	18.9	14.3	
	Lake Frances	111.9	77.8	79.6	70.9	
	Milk	Elwell (Tiber)	1,347.0	505.7	538.5	540.8
	Beaver Creek	3.5	0.8	1.4	1.5	
	Fresno	127.2	32.2	38.7	65.4	
	Nelson	66.8	28.8	22.2	43.3	
HUDSON BAY						
St. Mary's	Lake Sherburne	64.3	14.6	35.8	20.1	
YELLOWSTONE						
Stillwater	Mystic Lake	21.0	6.1	6.0	10.0	
Clark's Fork	Cooney	27.4	---	14.6	14.6	
Tongue	Tongue River	68.0	18.1	---	32.5	
Bighorn	Bighorn Lake	1,356.0	882.5	907.5	536.0	

SATELLITE SNOW COVER



MISSOURI RIVER BASIN Above Canyon Ferry Dam

DATE	PERCENT SNOW COVER	AVERAGE SNOWLINE ELEVATION IN FEET
November 8, 1981	9.5	8535
November 19, 1981	53	6530
November 26, 1981	100	3800
November 29, 1981	100	3800
December 7, 1981	71	5770
December 17, 1981	100	3800
December 20, 1981	91	4680
December 29, 1981	95	4380
January 6, 1982	96	4300
January 10, 1982	91	4680
January 17, 1982	100	3800
February 3, 1982	100	3800

AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

GOVERNMENT AGENCIES

Canada

Department of the Environment
Atmospheric Environment Service
Water Management Service
British Columbia Ministry of Environment
Inventory and Engineering Branch, Hydrology Section
Alberta Environment
Technical Services Division

Federal

Department of the Army - Corps of Engineers
Department of Agriculture - Forest Service
- Soil Conservation Service
Department of Commerce - National Environmental Satellite Service
- National Weather Service
Department of Interior - Bureau of Indian Affairs
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Bureau of Reclamation
Department of Energy - Bonneville Power Administration

STATE AGENCIES

Montana Conservation Districts
Montana Department of Fish, Wildlife and Parks
Montana Department of Natural Resources and Conservation
Montana State University - Agricultural Experiment Station
University of Montana - School of Forestry

PRIVATE ORGANIZATIONS

The Anaconda Company
Big Sky of Montana
Butte Water Company
Flathead Valley Community College
Montana Power Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.